

What is claimed is:

1. A data communication apparatus connected to at least more than one of data holding apparatuses, the data communication apparatus being allowed to use at least a

5 part of data held by the data holding apparatuses as shared data, the data communication apparatus comprising:

a search request generating and transmitting section for generating a search request which requests a data holding apparatus to search shared data corresponding to a given search condition from the shared data held by the data holding apparatus, and for transmitting the search request generated to the data holding apparatus;

a search result receiving section for receiving a search result for the search request from the data holding apparatus;

a data transmission request generating and transmitting section for generating a data transmission request which requests to transmit shared data searched based on the search result received by the search result receiving section, and for transmitting the data transmission request generated to the data holding apparatus; and

a data receiving section for receiving shared data requested to be transmitted by the data transmission request from the data holding apparatus to which the data

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transmission request is transmitted by the data
transmission request generating and transmitting section.

2. The data communication apparatus of claim 1, wherein
5 the search request generating and transmitting section
generates the search request which requests the data
holding apparatuses to search shared data which associates
with a specific keyword.

10 3. The data communication apparatus of claim 1, wherein
the search request generating and transmitting section
which transmits the search request, respectively, to all
the data holding apparatuses connected with the data
communication apparatus.

15 4. The data communication apparatus of claim 1, further
comprising a search request transmitting destination
information storing section for storing search request
transmitting destination information which specifies a
20 certain number of the data holding apparatuses as
destinations to which the search request is transmitted;

wherein the search request generating and
transmitting section transmits the search request to the
certain number of the data holding apparatuses specified
25 in the search request transmitting destination information

stored in the search request transmitting destination
information storing section.

5. The data communication apparatus of claim 4, wherein
5 the search request transmitting destination information
storing section stores a plurality of search request
transmitting destination information; and

wherein the search request generating and transmitting section transmits the search request to a certain number of data holding apparatuses specified in specific search request transmitting destination information out of the plurality of search request transmitting destination information.

15 6. The data communication apparatus of claim 5, wherein the search request transmitting destination information storing section stores the plurality of search request transmitting destination information each having an individual identifier being set respectively, and

20 wherein the search request generating and
transmitting section generates the search request
including an identifier being set to the specific search
request transmitting destination information, and
transmits the search request generated to the certain
25 number of data holding apparatuses specified in the

specific search request transmitting destination information.

7. The data communication apparatus of claim 1, wherein
5 the search request generating and transmitting section gradually transmits the search request through a plurality of stages to a plurality of data holding apparatuses according to a given transmission order;

10 wherein the search result receiving section notifies the search request generating and transmitting section of stopping transmission of the search request, upon reception of a given number of search results; and

15 wherein the search request generating and transmitting section stops the transmission of the search request based on a notification of stopping the transmission of the search request from the search result receiving section.

8. The data communication apparatus of claim 4, wherein
20 the search request transmitting destination information storing section stores a search request transmitting destination information including an order of transmitting the search request being set for each of the certain number of data holding apparatuses; and

25 wherein the data communication apparatus further

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comprises a transmission order setting section for transmitting test data to each of the certain number of data holding apparatuses, receiving a response to the test data from each of the certain number of data holding apparatuses, measuring a time between the transmission of the test data and the reception of the response to the test data for each of the certain number of data holding apparatuses, and for setting an order of transmitting the search request for each of the certain number of data holding apparatuses based on a measured result of each of the certain number of data holding apparatuses.

9. The data communication apparatus of claim 1, further comprising a search request history information storing section for storing search request history information which indicates for each search request a set of a search condition and corresponding search result for the search request;

wherein the search request generating and transmitting section extracts a specific search condition from the search request history information stored in the search request history information storing section, and notifies the search result receiving section of a search result corresponding to the specific search condition extracted.

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10. The data communication apparatus of claim 4, further comprising an identification information communicating section for receiving from a specific data holding apparatus identification information on the specific data holding apparatus;

wherein the search request transmitting destination information storing section stores the specific data holding apparatus in the search request transmitting destination information by using the identification information of the specific data holding apparatus received by the identification information communicating section.

11. The data communication apparatus of claim 10, wherein the search request transmitting destination information storing section does not add the specific data holding apparatus in the search request transmitting destination information in a given condition.

12. The data communication apparatus of claim 10, wherein the identification information communicating section transmits identification information on the data communication apparatus to a plurality of data holding apparatuses and receives identification information from

each of the plurality of data holding apparatuses;

wherein the search request transmitting destination information storing section stores the plurality of data holding apparatuses in the search request transmitting destination information by using the identification information on each of the plurality of data holding apparatuses received by the identification information communicating section.

10 13. The data communication apparatus of claim 1, further comprising an update confirmation requesting section for transmitting an update confirmation request which requests a specific data holding apparatus to confirm that specific shared data is updated or not;

15 wherein the data receiving section receives the specific shared data being updated from the specific data holding apparatus based upon a confirmation of the specific shared data being updated by the specific data holding apparatus.

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14. The data communication apparatus of claim 4, wherein the search request transmitting destination information storing section stores search request transmission designation information having an order of transmitting the search request being set for each of the certain

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number of data holding apparatuses;

wherein the data communication apparatus further comprises a data reception number counting section for counting a number of data reception by the data receiving
5 section for each of data holding apparatuses which transmitted shared data to the data receiving section, and for setting for each of the certain number of data holding apparatuses the order of transmitting the search request based on a counted result on the number of data reception.

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15. The data communication apparatus of claim 1, further comprising:

a shared data storing section for storing data which the data communication apparatus holds as the shared data
15 with the data holding apparatuses;

a search executing section for receiving a search request from a specific data holding apparatus, the search request requesting to search shared data corresponding to a given search condition from the shared data stored in
20 the shared data storing section, for searching the shared data corresponding to the search condition based on the search request received, and for transmitting a search result to the specific data holding apparatus;

a data transmission request receiving section for
25 receiving from the specific data holding apparatus a data

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transmission request which requests to transmit shared data searched by the search executing section; and

5 a data transmitting section for transmitting shared data requested to be transmitted to the specific data holding apparatus based on the data transmission request received by the data transmission request receiving section.

16. A data communication apparatus, connected with at least more than one of data holding apparatuses, sharing with the data holding apparatuses at least a part of data which the data communication apparatus holds as shared data, the data communication apparatus comprising:

15 a shared data storing section for storing data which the data communication apparatus holds as the shared data;

20 a search executing section for receiving a search request from a specific data holding apparatus, the search request requesting to search shared data corresponding to a given search condition from the shared data stored in the shared data storing section, for sharing the shared data corresponding to the search condition based on the search request received, and for transmitting a search result to the specific data holding apparatus;

25 a data transmission request receiving section for receiving from the specific data holding apparatus a data

transmission request which requests to transmit shared data searched by the search executing section; and

a data transmitting section for transmitting shared data requested to be transmitted to the specific data

5 holding apparatus based on the data transmission request received by the data transmission request receiving section.

17. The data communication apparatus of claim 15 or 16,
10 further comprising an index generating section for generating an index of the shared data stored in the shared data storing section;

wherein the search executing section searches the shared data corresponding to the search condition by using
15 the index generated by the index generating section.

18. The data communication apparatus of claim 17,
wherein the index generating section generates a plurality of indexes each having an individual identifier being set;
20 and

wherein the search executing section receives the search request including an identifier corresponding to one of identifiers being set to the plurality of indexes, and searches the shared data corresponding to the search
25 condition by using an index having an identifier

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corresponding to the identifier included in the search request received.

19. The data communication apparatus of claim 17,
5 wherein the index generating section examines regularly the shared data stored in the shared data storing section, and updates contents of the index based on an examined result.

10 20. The data communication apparatus of claim 15 or 16, further comprising an update confirming section for receiving from one of the data holding apparatuses an update confirmation request which requests to confirm that specific shared data is updated or not, and for confirming
15 that the specific shared data is updated or not based on the update confirmation request received;

wherein the data transmitting section transmits the specific shared data being updated to the one of the data holding apparatuses which transmitted the update
20 confirmation request, when the update confirming section confirms that the specific shared data has been updated.

21. The data communication apparatus of claim 15,
wherein the shared data storing section stores the shared
25 data received by the data receiving section.

22. A data communication method for communicating with at least more than one of data holding apparatuses and for using at least a part of data held by the data holding apparatuses as shared data, the data communication method comprising:

generating a search request which requests a data holding apparatus to search shared data corresponding to a given search condition from the shared data held by the data holding apparatus;

transmitting the search request generated to the data holding apparatus;

receiving search result for the search request from the data holding apparatus;

generating a data transmission request which requests to transmit shared data searched based on the search result received in the receiving the search result;

transmitting the data transmission request generated to the data holding apparatus; and

receiving shared data requested to be transmitted by the data transmission request from the data holding apparatus to which the data transmission request is transmitted in the transmitting the data transmission request.

23. A data communication method for communicating with at least more than one of data holding apparatuses and for sharing with the data holding apparatuses at least a part of data which the data communication method holds as

5 shared data, the data communication method comprising:

storing data which the data communication method holds as the shared data;

receiving a search request from a specific data holding apparatus, the search request requesting to search
10 shared data corresponding to a given search condition from the shared data stored in the storing;

searching the shared data corresponding to the search condition based on the search request received;

transmitting a search result to the specific data
15 holding apparatus;

receiving a data transmission request which requests to transmit shared data searched in the searching, from the specific data holding apparatus; and

transmitting shared data requested to be transmitted
20 to the specific data holding apparatus based on the data transmission request received in the receiving the data transmission request.

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